

CC EXPERIMENT 8

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Div: T11

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Aim:

To understand Docker Architecture and Container Life Cycle, install Docker and execute docker commands to manage images and interact with containers.

Theory:

Docker is a popular platform that enables developers to build, package, and deploy applications as lightweight, portable, and self-sufficient containers. These containers encapsulate all the necessary dependencies and libraries required for an application to run, ensuring consistency across different environments. Here is a theoretical overview of Docker:

Containerization:

Docker utilizes containerization technology to create isolated environments for applications. Containers are lightweight, standalone, and executable packages that include everything needed to run an application, such as code, runtime, system tools, libraries, and settings. This isolation ensures that applications run consistently across different environments, from development to production.

Docker Engine:

At the core of Docker is the Docker Engine, which is responsible for building, running, and managing containers. It consists of the Docker daemon, which manages containers, images, networks, and volumes, and the Docker client, which allows users to interact with the daemon through the Docker API.

Docker Images:

Docker images are read-only templates used to create containers. They contain the application code, runtime, libraries, dependencies, and other files needed to run the application. Images are built using Dockerfiles, which are text files that define the steps needed to create the image.

Docker Containers:

Containers are instances of Docker images that are running as

isolated processes on a host machine. They are lightweight, portable, and can be easily started, stopped, moved, and deleted. Containers provide a consistent environment for applications to run, regardless of the underlying infrastructure.

Benefits of Docker:

Portability: Docker containers can run on any platform that supports Docker, making it easy to deploy applications across different environments.

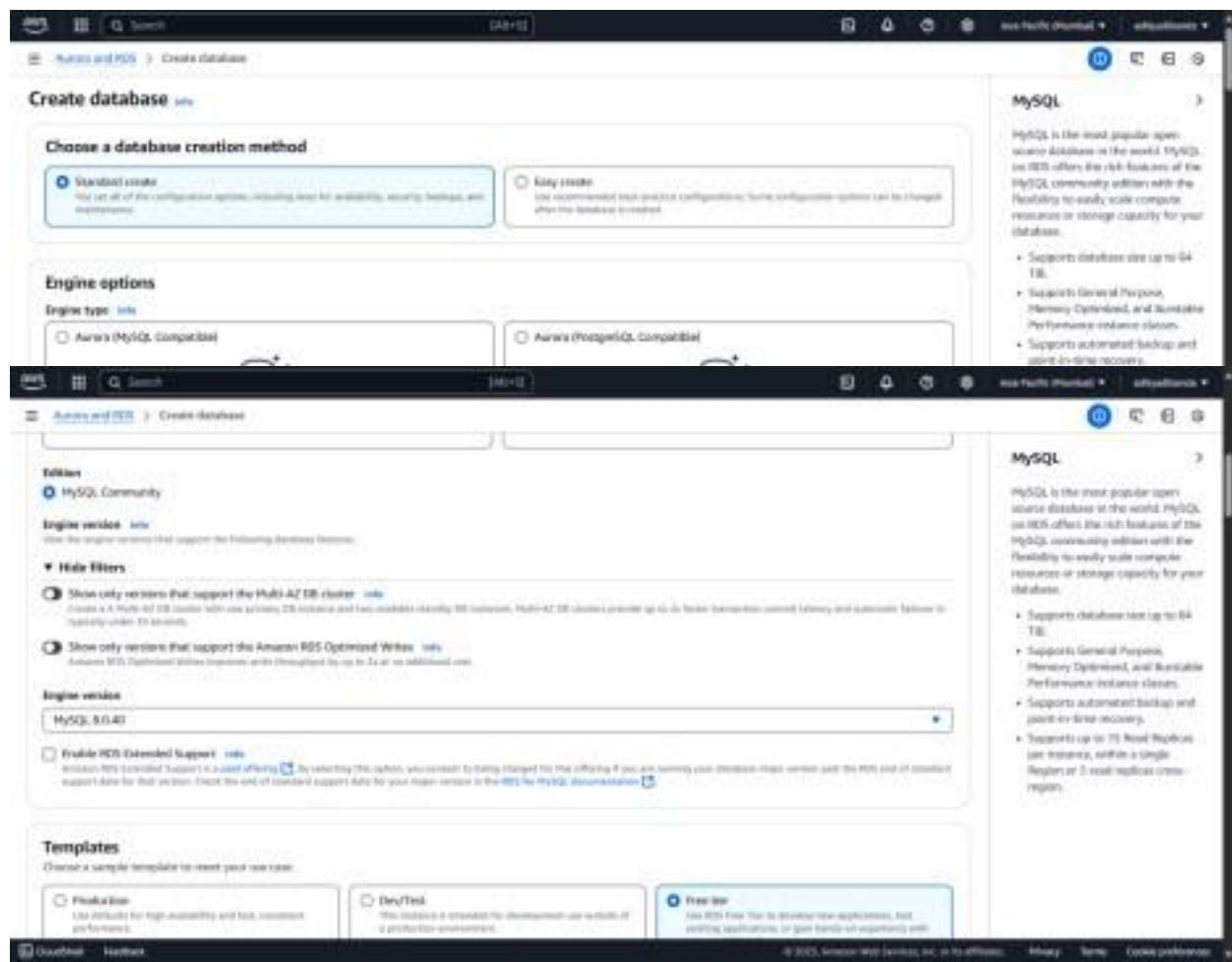
Efficiency: Containers share the host OS kernel, reducing overhead and improving resource utilization.

Isolation: Containers provide a level of isolation that helps prevent conflicts between applications and dependencies.

Scalability: Docker enables easy scaling of applications by quickly spinning up additional containers.

Consistency: Docker ensures that applications run the same way in development, testing, and production environments.

Output:



Availability Zone [info](#)

us-east-1a

RDS Proxy

RDS Proxy is a Fully managed, highly available database proxy that improves application scalability, reliability, and security.

☒ **Create an RDS Proxy** [info](#)

RDS automatically provisions an RDS instance and a separate Amazon ElastiCache instance for the proxy. RDS Proxy has additional costs. For more information, see [Amazon RDS Proxy pricing](#).

Certificate authority - optional [info](#)

Using a custom certificate provides an extra layer of security by validating that the connection is being made to an Amazon RDS instance. It does so by checking the server certificate that is automatically installed on all Amazon RDS instances.

aws-ca-rsa0404-g1 [default]

Issued: May 28, 2024

If you don't select a certificate authority, RDS chooses one for you.

Additional configuration

Tags - optional

A tag consists of a user-specified key-value pair.

Key

ENV

Value

UAT

[Add new tag](#)

[MySQL](#)

MySQL is the most popular open-source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your instances.

- Supports database size up to 64 TB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, which is simple Region or 5 read-replica cross-Regions.

IAM role

The following OpenSearch role is used for publishing logs to CloudWatch Logs.

[RDS service-linked role](#)

► **Additional configuration**

Database options, encryption turned on, backup turned on, logging turned off, maintenance, CloudWatch Logs, deletion protection turned off

Estimated monthly costs

The Amazon RDS Free Tier is available to you for 12 months. Each calendar month, the free tier will allow you to use the Amazon RDS resources listed below for free:

- 750 hrs of Amazon RDS in a Single-AZ db instance, db.t3.micro or db.t3.small instances.
- 28 GB of General Purpose Storage (SSD).
- 28 GB for automated backup storage and any user-initiated DB snapshots.

[Learn more about AWS Free Tier](#)

After your free usage expires or if your application use exceeds the free usage limit, you simply pay standard, pay-as-you-go service rates as described in the [Amazon RDS Pricing page](#).

ⓘ You are responsible for ensuring that you have all of the necessary rights for any third-party products or services that you use with AWS services.

[Cancel](#) [Create database](#)

MySQL

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TB.
- Supports General Purpose, Memory Optimized, and Burstable Performance Instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 Read Replicas cross-Region.


```
aws
[Alt+Q]
Asia Pacific (Mumbai)
adityadikonda

Fetch the logs of a container
ec2-user@ip-172-30-0-203 ~$ sudo docker run -it --rm mysql:8.0 mysql -h t1224.c3aaql8w4qsg.ap-south-1.rds.amazonaws.com -u admin -p
Unable to find image 'mysql:8.0' locally
8.0: Pulling from library/mysql
a6172a6e83b: Pull complete
9e01aa53f13: Pull complete
5fa3211d7a7: Pull complete
53b8441f7e6: Pull complete
d1339a14fala: Pull complete
a6386ff914e3: Pull complete
d3272c957f26: Pull complete
106a4902288: Pull complete
d36f4325df2d: Pull complete
d34979e7120: Pull complete
a67a2f637e5: Pull complete
Digest: sha256:b5f77825b52ab281d6281fb281eabfbc73507eda8f2c2745790251533ef0306
Status: Downloaded newer image for mysql:8.0
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 28
Server version: 8.0.40 Source distribution

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases
+-----+
| Database |
+-----+
|          |
+-----+
```

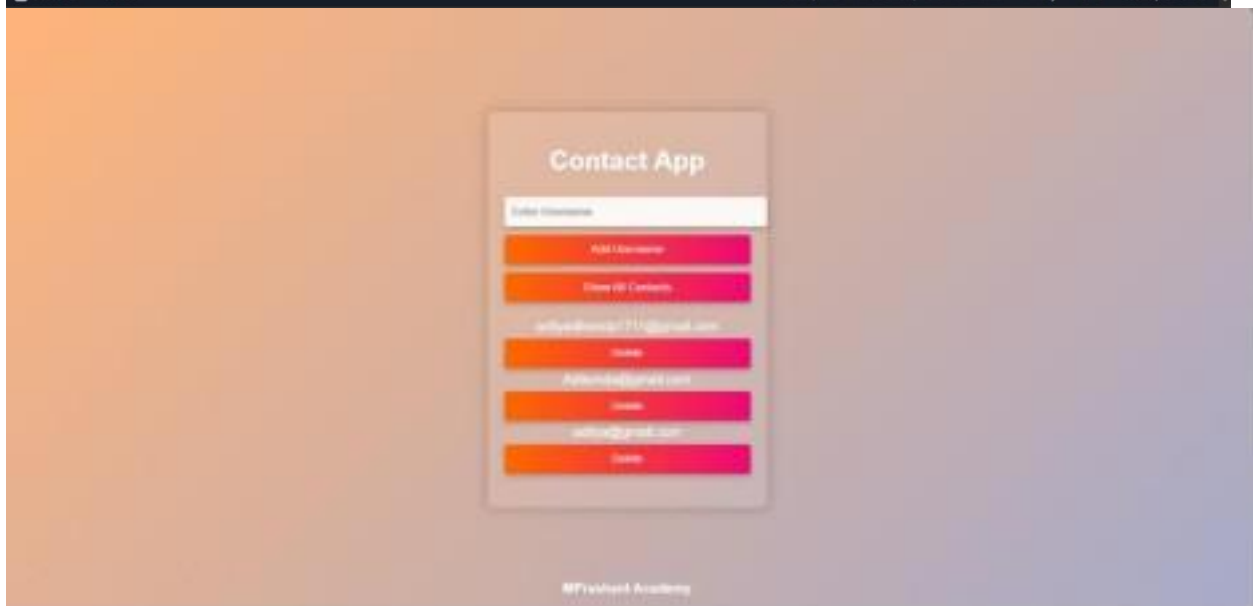
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[Alt+S]
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Fetch the logs of a container
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d3272c957f26: Pull complete
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d36f4325df2d: Pull complete
d34979e7120: Pull complete
a67a2f637e5: Pull complete
Digest: sha256:b5f77825b52ab281d6281fb281eabfbc73507eda8f2c2745790251533ef0306
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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases
+-----+
| Database |
+-----+
```




```
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases
->
+-----+
| Database |
+-----+
| information_schema |
| my_app_db |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.00 sec)

mysql> use my_app_db
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----+
| Tables_in_my_app_db |
+-----+
| contacts |
+-----+
1 row in set (0.00 sec)

mysql> select * from contacts
->
+-----+
| id | username |
+-----+
| 1 | adityadikondal711@gmail.com |
| 2 | Adikonda@gmail.com |
+-----+
```

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Conclusion:

Docker revolutionizes the software development and deployment process by providing a powerful platform for containerization. By encapsulating applications and their dependencies into lightweight, portable containers.